Control Engineering INDEX

VOLUME 7...JANUARY—DECEMBER 1960

(WN) What's New
(IP) Industry's Pulse Unless otherwise designated, items are feature articles or Ideas at Work.

A

Actuators

Air expansion powers new actuator. H. W. Kogan ....Aug. 137
Choosing the actuator for linear feed hydraulic servos. C. K. Taft....Feb. 85
Compensating dc motors for fast response. S. W. Harris....Oct. 115
The strange new ball motor. E. R. Laithwaite ....Jan. 131
Two new ways to vary induction motor speed. E. R. Laithwaite....July 92
Unique electric thruster uses two motors. D. L. Schrader ....June 141

Adaptive control

Adaptive principle. J. E. Gibson
Part I: Making sense out of the adaptive principle ....Aug. 113
Part II: Mechanizing the adaptive principle ....Oct. 109
Part III: Generalizing the adaptive principle ....Dec. 93
Duplicating the performance of biological systems (WN)....Oct. 28
Simple adaptive controller combines high stability, high accuracy. Karl Eklund ....Apr. 161

Air traffic control

Holland builds Europe's most mechanized air traffic control center (WN) ....Apr. 43

Aircraft

The aircraft industry shudders (IP) Jan. 95
Better inertial indicators for attitude and heading. J. M. Slater ....Feb. 88
The system characteristics of modern guidance techniques—report. Dr. C. J. Mundo ....Aug. 85
Test fixture aids design of fuel controller. H. S. D. Yang....July 89
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan...Dec. 117
Wright-Patterson shifts gears: aircraft control spills over into space (WN) Mar. 29

Amplifiers

Electronic
Selecting amplifiers for high-performance servovalves. R. E. Claflin Jr. ....Nov. 139
Mechanical
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky ....Feb. 80
Pneumatic
Fluid computing elements open new doors in control (WN) ....May 26

Analysis Instruments

Automatic analyzers convert yeast plant to continuous operation. Sher & Rodger ....Sept. 190
Chromatography steps up the pace (WN) ....July 37
Infrared analyzer controls hydrocarbon extraction process. D. M. Stagg & others ....Dec. 109
Keeping sample lines hot. E. A. Houser ....June 123
Polaris propellant—first continuous production (WN) ....Oct. 32
Sizing analyzer sampling lines. E. A. Houser ....Aug. 129
Spectrometer directs maintenance program (WN) ....June 32
Stream analyzer dynamics, R. L. Grantom & others
Part I: Testing techniques and apparatus ....May 113
Part II: Refractometer response to temperature and composition change ....July 104
What eddy currents reveal about metals. Richard Hochschild ...Mar. 117

Automatic Warehousing

Electronic warehouse (WN)....Feb. 26
Static switches run a sugar warehouse. Giacomelli & Bullock ....May 118
TV and magnetic tape speed Air Force warehousing (WN) ....Dec. 35

B

Business control

Computer keeps tabs on work in process. E. W. Cannon ....Sept. 138
Controlling production paperwork. L. H. Young ....Sept. 140
Manufacturing control with a 705. J. M. Cherba ....May 132
Totalisator for retailer's paperwork (WN) ....Nov. 35
Using corporate models for business control. H. R. Karp....Sept. 135
Using electronic adding machines as cheap ADP system components. J. F. Sharp ....Nov. 119
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan..Dec. 117

C

Circuits

Circuits for high-ambient, differential pressure measurement. G. J. Moynihan ....Apr. 163
Counting pulses within the magnetic hysteresis loop. T. R. Nisbet...Nov. 150
Don't overlook POSITIVE feedback. William Scharf ....Nov. 115
Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich ....June 110
Fail-safe circuit for high-speed transfer. M. A. Keasal Jr. ....Nov. 161
Gas diodes indicate and remember. G. W. Krebs....Dec. 129
Precision differential capacitors for analog multiplication. W. F. Hay..June 139
Simple analogs for useful nonlinearities. Kovach & Comley ....Nov. 135
Single time-shared drive positions two axes. G. W. Younkin....Aug. 122
Three analog computer circuits for the root locus. Gordon Carden....Apr. 127
Two line hydraulic diagrams. George Stelmach ....Dec. 120

Coding of data

Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich ....June 110
Forward-backward counter for the Gray code. G. D. Beinhocker ....Feb. 117
Techniques and equipment for digital data conversion. R. F. Shaw...Mar. 107

Components

The acceleration switching valve still has advantages. M. E. Moore..June 89
Air expansion powers new actuator. H. W. Kogan ....Aug. 137
Better inertial indicators for attitude and heading. J. M. Slater....Feb. 88
Cold gyro approaches perpetual motion (WN) ....Mar. 38
Evaluating today's proximity switches. J. M. Morgan ....Apr. 115
Fast component tester checks itself too. Saul Liss ....Sept. 188
Fluid computing elements open new doors in control (WN)....May 26
The gyroscopic mass flowmeter. M. M. Decker ....May 139
Incremental servos. S. J. Bailey
Part I: Stepping vs stepless control ....Nov. 123
Part II: Operation and analysis..Dec. 97
Mechanical control cams. H. A. Rothbart ....June 118
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky ....Feb. 80
Novel caging scheme makes versatile stable platform. M. Selvin....Apr. 138
PNPN switches—diodes and triodes. J. M. Goldey ....Oct. 101
Precision differential capacitors for analog multiplication. W. F. Hay ....June 139
Shaft angle digitizer needs no brushes. C. J. Wayman....Aug. 145
Short guide to military synchro specs. Oppenheim & Sachs....Mar. 137
6 transducers for precision position measurement. J. O. Morin....May 107
Skewed-axis gears for low backlash.

Control Engineering INDEX

VOLUME 7...JANUARY—DECEMBER 1960

(WN) What's New
(IP) Industry's Pulse Unless otherwise designated, items are feature articles or Ideas at Work.

A

Actuators

Air expansion powers new actuator. H. W. Kogan ....Aug. 137
Choosing the actuator for linear feed hydraulic servos. C. K. Taft....Feb. 85
Compensating dc motors for fast response. S. W. Harris....Oct. 115
The strange new ball motor. E. R. Laithwaite ....Jan. 131
Two new ways to vary induction motor speed. E. R. Laithwaite....July 92
Unique electric thruster uses two motors. D. L. Schrader ....June 141

Adaptive control

Adaptive principle. J. E. Gibson
Part I: Making sense out of the adaptive principle ....Aug. 113
Part II: Mechanizing the adaptive principle ....Oct. 109
Part III: Generalizing the adaptive principle ....Dec. 93
Duplicating the performance of biological systems (WN)....Oct. 28
Simple adaptive controller combines high stability, high accuracy. Karl Eklund ....Apr. 161

Air traffic control

Holland builds Europe's most mechanized air traffic control center (WN) ....Apr. 43

Aircraft

The aircraft industry shudders (IP) Jan. 95
Better inertial indicators for attitude and heading. J. M. Slater ....Feb. 88
The system characteristics of modern guidance techniques—report. Dr. C. J. Mundo ....Aug. 85
Test fixture aids design of fuel controller. H. S. D. Yang....July 89
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan...Dec. 117
Wright-Patterson shifts gears: aircraft control spills over into space (WN) Mar. 29

Amplifiers

Electronic
Selecting amplifiers for high-performance servovalves. R. E. Claflin Jr. ....Nov. 139
Mechanical
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky ....Feb. 80
Pneumatic
Fluid computing elements open new doors in control (WN) ....May 26

Analysis Instruments

Automatic analyzers convert yeast plant to continuous operation. Sher & Rodger ....Sept. 190
Chromatography steps up the pace (WN) ....July 37
Infrared analyzer controls hydrocarbon extraction process. D. M. Stagg & others ....Dec. 109
Keeping sample lines hot. E. A. Houser ....June 123
Polaris propellant—first continuous production (WN) ....Oct. 32
Sizing analyzer sampling lines. E. A. Houser ....Aug. 129
Spectrometer directs maintenance program (WN) ....June 32
Stream analyzer dynamics, R. L. Grantom & others
Part I: Testing techniques and apparatus ....May 113
Part II: Refractometer response to temperature and composition change ....July 104
What eddy currents reveal about metals. Richard Hochschild ...Mar. 117

Automatic Warehousing

Electronic warehouse (WN)....Feb. 26
Static switches run a sugar warehouse. Giacomelli & Bullock ....May 118
TV and magnetic tape speed Air Force warehousing (WN) ....Dec. 35

B

Business control

Computer keeps tabs on work in process. E. W. Cannon ....Sept. 138
Controlling production paperwork. L. H. Young ....Sept. 140
Manufacturing control with a 705. J. M. Cherba ....May 132
Totalisator for retailer's paperwork (WN) ....Nov. 35
Using corporate models for business control. H. R. Karp....Sept. 135
Using electronic adding machines as cheap ADP system components. J. F. Sharp ....Nov. 119
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan..Dec. 117

C

Circuits

Circuits for high-ambient, differential pressure measurement. G. J. Moynihan ....Apr. 163
Counting pulses within the magnetic hysteresis loop. T. R. Nisbet...Nov. 150
Don't overlook POSITIVE feedback. William Scharf ....Nov. 115
Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich ....June 110
Fail-safe circuit for high-speed transfer. M. A. Keasal Jr. ....Nov. 161
Gas diodes indicate and remember. G. W. Krebs....Dec. 129
Precision differential capacitors for analog multiplication. W. F. Hay..June 139
Simple analogs for useful nonlinearities. Kovach & Comley ....Nov. 135
Single time-shared drive positions two axes. G. W. Younkin....Aug. 122
Three analog computer circuits for the root locus. Gordon Carden....Apr. 127
Two line hydraulic diagrams. George Stelmach ....Dec. 120

Coding of data

Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich ....June 110
Forward-backward counter for the Gray code. G. D. Beinhocker ....Feb. 117
Techniques and equipment for digital data conversion. R. F. Shaw...Mar. 107

Components

The acceleration switching valve still has advantages. M. E. Moore..June 89
Air expansion powers new actuator. H. W. Kogan ....Aug. 137
Better inertial indicators for attitude and heading. J. M. Slater....Feb. 88
Cold gyro approaches perpetual motion (WN) ....Mar. 38
Evaluating today's proximity switches. J. M. Morgan ....Apr. 115
Fast component tester checks itself too. Saul Liss ....Sept. 188
Fluid computing elements open new doors in control (WN)....May 26
The gyroscopic mass flowmeter. M. M. Decker ....May 139
Incremental servos. S. J. Bailey
Part I: Stepping vs stepless control ....Nov. 123
Part II: Operation and analysis..Dec. 97
Mechanical control cams. H. A. Rothbart ....June 118
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky ....Feb. 80
Novel caging scheme makes versatile stable platform. M. Selvin....Apr. 138
PNPN switches—diodes and triodes. J. M. Goldey ....Oct. 101
Precision differential capacitors for analog multiplication. W. F. Hay ....June 139
Shaft angle digitizer needs no brushes. C. J. Wayman....Aug. 145
Short guide to military synchro specs. Oppenheim & Sachs....Mar. 137
6 transducers for precision position measurement. J. O. Morin....May 107
Skewed-axis gears for low backlash.

W. C. Macfarland....Jan. 145
The strange new ball motor. E. R. Laithwaite....Jan. 131
That amazing semiconductor business (IP)....May 91
Three magnets make simple linear to rotary converter. J. J. Dietz...Dec. 131
Transistor-relay hybride for close-differential switching. A. N. DeSautels Apr. 151
Tunnel diode—will it fit into control? (WN)....Apr. 38
Welding control uses new components (WN)....Apr. 31

Composition measuring (see Analysis instruments)

Computers

Analog
Analog setup solves polynominals, plots root locus automatically. Leon Levine....Oct. 125
Mechanical control cams. H. A. Rothbart....June 118
Simple analogs for useful nonlinearities. Kovach & Comley....Nov. 135
Three analog computer circuits for the root locus. Gordon Carden....Apr. 127
Digital
A comparison of integral and incremental digital computers for process control applications. E. L. Braun....Jan. 113
Computers unfold the secrets of human behavior. L. H. Young...Oct. 120
Digital computer runs hot plate mill. Cliff Burdick....Jan. 126
GE's plunge into data processing (WN)....July 22
GP computer designed as a system component (WN)....May 32
New computers debut: G-20, desk-size unit (WN)....Apr. 35
RCA's new computers raise curtain on three C's (WN)....June 36
The story of an ultra-reliable computer. A. P. Hendrickson....July 113
Using electronic adding machines as cheap ADP system components. J. F. Sharp....Nov. 119
Special purpose
Computer rescues the voting process. W. D. Bell....Feb. 65
Computers unfold the secrets of human behavior. L. H. Young..Oct. 120
Digital computer runs hot plate mill. Cliff Burdick....Jan. 126
Electronic warehouse (WN)...Feb. 26
A unique analog analyzer for nonlinear systems. W. H. Alliston Dec. 135

Computing control

Bringing hot strip mills under automatic control. Bristol & Kraft..Sept. 146
Closed loop computer control at Luling. Eisenhardt & Williams...Nov. 103
A comparison of integral and incremental digital computers for process control applications. E. L. Braun..Jan. 113
Controlling a thermal cracking furnace with a digital computer. J. R. Parsons & others....Sept. 150
Cyanamid's approach to computer control. Herbert Grohskopf....Feb. 70
Digital computer runs hot plate mill. Cliff Burdick....Jan. 126
Evaluating control system payout from process data. T. M. Stout....Feb. 93
Goodrich eases into computing control (WN)....Apr. 20
The missing market in computing control (IP)....Nov. 95
Russian train computer controlled. G. Kononenko....Apr. 159
Standard takes three giant steps in computing-control (WN)....June 40
Starting an electric generating station—automatically. W. A. Summers..Sept. 154
Using corporate models for business control. H. R. Karp....Sept. 135

Controllers, electronic

Blocking oscillator linearizes pneumatic electric converter. W. J. Donnelly....Feb. 113
Britain's IEA Show—four new electronic process controls debut (WN) July 25
Electronic controls replace pneumatics on gas compressors. V. A. Riggio....Sept. 174
Simple adaptive controller combines high stability, high accuracy. Karl Eklund....Apr. 161
What's available in Europe for electronic process control—report. Barlow & May Part I June 103, Part II July 107, Part III....Oct. 105

Counters

Counting pulses within the magnetic hysteresis loop. T. R. Nisbet...Nov. 150
Forward-backward counter for the Gray Code. G. D. Beinhocker....Feb. 117

D

Data files (reference sheets)

33. Analysis and stabilization of sampled data systems. G. J. Thaler..Jan. 123
34. Choosing the actuator for linear feed hydraulic servos. C. K. Taft....Feb. 85
35. Short guide to military synchro specs. Oppenheim & Sachs....Mar. 137
36. Three analog computer circuits for root locus. Gordon Carden....Apr. 127
37. A guide to the display of information. G. A. Peters....May 123
38. Speed control methods for dc motors. C. S. Siskind....June 115
39. Quick new method gives system time constants. H. K. Chatterjee....July 97
40. Formulas for transistor dissipation during high frequency switching. Currence & Wheeler....Aug. 127
41. How to find emergency air needs for pneumatic instruments. F. Caplan....Oct. 127
42. Simple analogs for useful nonlinearities. Kovach & Comley..Nov. 135
43. A simple template makes bode plots easy. C. A. Stapleton....Dec. 111

Data processing

Australia inventories its data processing prospects (WN)....Aug. 35
Computer keeps tabs on work in process. E. W. Cannon....Sept. 138
Computer rescues the voting process. W. D. Bell....Feb. 65
Computer talks about weather, makes best predictions. (WN)....Sept. 41
Computers unfold the secrets of human behavior. L. H. Young....Oct. 120
Data processing for numerical positioning systems. R. A. Bennett....Jan. 142
How the biggest user sees ADP (IP) Feb. 57
Logger keeps track of time charges on five computers. Joseph Piskor..Apr. 133
Manufacturing control with a 705. J. M. Cherba....May 132
Simple logic logs lab measurements. Jacques Vidal....May 153
Statistical computers can *really* reduce data. E. J. Schubert....Apr. 146
Techniques and equipment for digital data conversion. R. F. Shaw....Mar. 107
Totalisator for retailer's paperwork (WN)....Nov. 35
Using electronic adding machines as cheap ADP system components. J. F. Sharp....Nov. 119
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan...Dec. 117

Data reduction

Evaluating control system payout from process data. T. M. Stout....Feb. 93
Oscillograph reader-plotters can be breadboarded. D. S. L. Durie..Apr. 157
Reader-computer-plotter link saves data reduction time....Jan. 155
Statistical computers can *really* reduce data. E. J. Schubert....Apr. 146
Wind tunnel interrupts 709 for fast data reduction. T. M. Bellan...Dec. 117

Data transmission

Controlling production paperwork. L. H. Young....Sept. 140
Data on the move (WN)....May 36
Industrial market blooms for data communication (IP)....July 59
Installing pneumatic signal transmission systems....Jan. 137
Telemeter system reads meters by telephone. E. J. Smith....Nov. 155
Telemetered data pegs cause of Bluebird accident....Nov. 157

Digital servos

Binary pneumatic cylinders position printer head. R. M. Rose....May 149
Digital gain changer gives optimum slowdown. D. A. Poepsel....July 125
Digital servo for numerical control uses unique transducer....May 155
Incremental servos. S. J. Bailey
Part I: Stepping vs stepless control....Nov. 123
Part II: Operation and analysis..Dec. 97
Simple digital servo programs process controller set-points. J. F. Sharp Jan 149

Digital techniques

Counting pulses within the magnetic hysteresis loop. T. R. Nisbet..Nov. 150
Digital gain changer gives optimum slowdown. D. A. Poepsel....July 125
Digital logic improves photoelectric length measurement. Robert Sterns Dec. 114
Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich....June 110
Gas diodes indicate and remember. G. W. Krebs....Dec. 129
Innovations in numerical control..Oct. 139
Numerical building blocks control turret lathe. H. W. Mergler....July 69
Programmed manipulator cuts forging time. Baker & Tomlinson....Sept. 194

Display of data

Binary pneumatic cylinders position printer head. R. M. Rose....May 149
A guide to the display of information. G. A. Peters....May 123
Putting the man-in-space on display (WN)....June 29
Recording a variable and its integral with one pen. L. Pritkin....Oct. 149
Take a new look at the process control center. A. J. Waldron....Mar. 132
Techniques of dynamic display. R. A. Barker

Part I: Cathode ray tubes.....Feb. 100
Part II: Optics at work.....Apr. 121
Part III: From TV pickup to Matrix cells .....June 97

E

Economics

Automatic systems in the plant. W. E. Vannah .....Sept. 132
Commerce sees instruments sales increase (WN) .....Feb. 40
Control enters a new decade. W. E. Vannah .....Jan. 101
Crisis in exports (IP) .....June 83
Evaluating control system payout from process data. T. M. Stout.....Feb. 93
Updating process instrument costs. J. W. Bernard .....Apr. 143
A user reports: rapid return from tape control (WN) .....May 22

Editorials

An experiment in ethics.....May 97
Control still expanding.....Jan. 99
Could PERCOS perk?.....June 87
From standard practice to unique design .....Feb. 61
The great electronic haystack....Mar. 105
Needs to know.....Nov. 99
No leap frog yet, but look out....Aug. 83
Open books open minds.....Dec. 85
The pace quickens.....Oct. 97
Reliability could become a disease..Apr. 105
What's in a name.....July 65

F

Flow

Automatic vacuum system pipes bulk materials. C. H. Bast.....Sept. 197
Four up-to-date blending systems. Derek Barlow .....Sept. 180
The gyroscopic mass flowmeter. M. M. Decker .....May 139
Installing rotameters .....Mar. 115

Foreign control

Australia inventories its data processing prospects (WN) .....Aug. 35
Britain—shopping by card in automatic supermarkets (WN).....Oct. 40
Britain—will a government automation center break the information bottleneck? (WN) .....May 42
Britain's IEA Show—four new electronic process controls debut (WN) July 25
British nuclear controls slowed by fear of government regulations (WN) Jan. 42
German process control (WN) ..Feb. 36
Holland builds Europe's most mechanized air traffic control center (WN) .....Apr. 43
Italian control makers try something new; electronics (WN) .....Jan. 44
Japan joins the giants (IP).....Apr. 101
A look at control abroad (WN)...Oct. 46
Numerical control in Japan.....Mar. 140
100,000 jam Interkama (WN)...Dec. 30
Russians buy a tire plant (WN)..Mar. 40
What's available in Europe for electronic process control—report. Barlow & May. Part I June 103. Part II July 107, Part III.....Oct. 105

Function generators

Function generator control for vibration sweep testing. J. M. Chirnitch..Nov. 159
Nonideal diodes and practical function generators. E. J. Galli.....Feb. 107

G

Graphic analysis

Analysis and stabilization of sampled data systems. G. J. Thaler.....Jan. 123
Graph simplifies reel drive calculations. H. L. Steinmetz .....Feb. 71
How to compute load constants from response curve data. B. B. Bellit..May 105
A simple template makes bode plots easy. C. R. Stapleton.....Dec. 111
Stabilizing on-off pneumatic control systems. Karl Eklund .....Oct. 134

Guidance

Better inertial indicators for attitude and heading. J. M. Slater.....Feb. 88
Novel caging scheme makes versatile stable platform. M. Selvin....Apr. 138
The system characteristics of modern guidance techniques—report. Dr. C. J. Mundo.....Aug. 85

H

Hydraulics

The acceleration switching valve still has advantages. M. E. Moore..June 89
Choosing the actuator for linear feed hydraulic servos. C. K. Taft...Feb. 85
Two line hydraulic diagrams. George Stelmach .....Dec. 120

I

Industrial control

Automatic cargo controls sail with freighters (WN) .....Jan. 27
Automatic inspection and computation reduce reject rate. A. M. Dexter .....Sept. 185
Automatic metalworking: a status report. J. D. Cooney.....Sept. 158
Automatic systems in the plant. W. E. Vannah .....Sept. 132
Automatic vacuum system pipes bulk materials. C. H. Bast.....Sept. 197
Automatic welder gets position from arc current. K. J. Rhodes.....Oct. 147
Bypass loop helps temperature controller maintain 1-deg control. E. W. Ellsworth .....Mar. 159
Choosing induction regulators for rectifier control. P. N. Wise.....July 109
Colorimeter prevents mixing of transformer insulating liquids. Kinney & Burnett .....May 151
Compensating dc motors for fast response. S. W. Harris .....Oct. 115
Data processing for numerical positioning systems. R. A. Bennett....Jan. 142
Dc drives set for new gains (IP)..Mar. 97
Digital computer runs hot plate mill. Cliff Burdick .....Jan. 126
Electronic controls replace pneumatics on gas compressors. V. A. Riggio Sept. 174
Electronic controls speed engine bore classification. J. R. Zurbrick....July 99
Electronic logic controls bread weight. W. J. Fowler .....Sept. 178
Evaluating today's proximity switches. J. M. Morgan .....Apr. 115
Fail-safe circuit for high-speed transfer. M. A. Keasal Jr.....Nov. 161
Fast component tester checks itself, too. Saul Liss .....Sept. 188
5 case studies show efforts to simplify maintenance. B. K. Ledgerwood..Mar. 126
Frame straightener programs bending automatically. K. J. Rhodes...Aug. 139
Gas diodes indicate and remember. G. W. Krebs.....Dec. 129
Innovations in numerical control..Oct. 139
Investigating thickness control on small scale rolling mills. R. B. Sims..June 95
Magnetic discs add automatic control to lumber mill (WN) .....Aug. 31
Manufacturing control with a 705. J. M. Cherba .....May 132
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky .....Feb. 80
New drives sharpen conveyor synchronization. R. B. Maag.....Sept. 192
New look in machine tool controls. M. H. Sluis.....Nov. 146
Numerical building blocks control turret lathe. H. W. Mergler.....July 69
Numerical control in Japan.....Mar. 140
Pot null detectors control tracer lathe. W. A. Breaux .....July 121
Programmed manipulator cuts forging time. Baker & Tomlinson.....Sept. 194
Protecting liquid rheostats. I. J. Gladnik .....Jan. 119
Punched tape controls carpet patterns. W. H. T. Neall.....Sept. 176
Punched tapes shape auto tailpipes .....Mar. 161
Scented movies are Broadway's newest hit (WN) .....Mar. 25
Shopping by card in automatic supermarkets (WN) .....Oct. 40
Single time-shared drive positions two axes. G. W. Younkin.....Aug. 122
6 transducers for precision position measurement. J. O. Morin.....May 107
Speed control methods for dc motors. C. S. Siskind .....June 115
Starting an electric generating station automatically. W. A. Summers..Sept. 154
Static switches run a sugar warehouse. Giacomelli & Bullock.....May 118
The strange new ball motor. E. R. Laithwaite .....Jan. 131
Telemeter system reads meters by telephone. E. J. Smith.....Nov. 155
Tiny electronic controls run giant coal digger. Theuer & Lenhard....Mar. 121
Transistors position press for quick die change. W. D. Berry.....July 123
Transparent tape programmer breaks sock pattern jacks. Charles Conway .....Oct. 153
Welding control uses new components (WN) .....Apr. 31

Industry's pulse

The aircraft industry shudders....Jan. 95
The crisis we face—a rebuttal by the military .....Dec. 77
Crisis in exports.....June 83
Dc drives set for new gains.....Mar. 97
How the biggest user sees ADP..Feb. 57
The impact on labor.....Sept. 125
Industrial market blooms for data communication .....July 59
Japan joins the giants.....Apr. 101
The missing market in computing control .....Nov. 95
National Education Act helps two ways .....Aug. 77
That amazing semiconductor business .....May 91
Which numerical control will go?..Oct. 93

Inspection, automatic

Automatic analyzers convert yeast plant to continuous operation. Sher & Rodger .....Sept. 190
Automatic inspection and computation reduce reject rate. A. M. Dexter Sept. 185
Electronic controls speed engine bore classification. J. R. Zurbrick...July 99
Fast component tester checks itself, too. Saul Liss .....Sept. 188

L

Labor

How the biggest user sees ADP (IP) Feb. 57
The impact on labor (IP) Sept. 125

Logic

Bistable jump circuit for static switching. P. J. Walsh Aug. 132
Digital logic improves photoelectric length measurement. Robert Sterns. Dec. 114
Eliminating diode redundancy in encoding and decoding matrices. Arthur Freilich June 110
Simple logic logs lab measurements. Jacques Vidal May 153
Transistor NOR element program welder. F. G. Dahlin Feb. 111
Transistors position press for quick die change. W. D. Berry July 123
The versatile transistor NOR circuit. A. N. DeSautels May 101

M

Machine control

Automatic inspection and computation reduce reject rate. A. M. Dexter. Sept. 185
Automatic metalworking: a status report. J. D. Cooney Sept. 158
Compensating dc motors for fast response. S. W. Harris Oct. 115
Data processing for numerical positioning systems. R. A. Bennett. Jan. 142
Digital servo for numerical control uses unique transducer May 155
3-axis tape control runs manufacturing machine. Michael Murphy. Dec. 125
Innovations in numerical control. Oct. 139
K&T's star performer (WN) Mar. 44
Mechanical power amplifier boosts torque, transmits position. L. A. Zahorsky Feb. 80
New look in machine tool controls. M. H. Sluis Nov. 146
Numerical building blocks control turret lathe. H. W. Mergler July 69
Numerical control in Japan Mar. 140
Optical programmer for numerically controlled drill press (WN) Sept. 46
Pot null detectors control tracer lathe. W. A. Breaux July 121
Single time-shared drive positions two axes. G. W. Younkin Aug. 122
6 transducers for precision position measurement. J. O. Morin May 107
A user reports: rapid return from tape control (WN) May 22
Which numerical control will go? (IP) Oct. 93
Will Bullard's patent claims test numerical control? (WN) Sept. 54

Maintenance

5 case studies show efforts to simplify maintenance. B. K. Ledgerwood. Mar. 126
Spectrometer directs maintenance program (WN) June 32

Man-machine systems

Aping man on computers—ASME aviation conference (WN) Aug. 38
Electronic teacher conditions the reflexes (WN) Dec. 39
The coming boom in teaching machines (WN) June 20
A guide to the display of information. G. A. Peters May 123

Marketing

Commerce sees instruments sales increase (WN) Feb. 40
Conoflow, valve manufacturer, solves the European market (WN) Apr. 46
Control enters a new decade. W. E. Vannah Jan. 101
Control's share of military budget continues to rise (WN) Sept. 37
Crisis in exports (IP) June 83
Defense control grows faster than military budget (WN) Aug. 40
General Controls blows out its thirtieth candle (WN) June 42
Putting customer satisfaction where it belongs—on application engineering (WN) May 46
The revolution at Designers for Industry (WN) July 42
That amazing semiconductor business (IP) May 91

Materials handling

Automatic vacuum system pipes bulk materials. C. H. Bast Sept. 197
New drives sharpen conveyor synchronization. R. B. Maag Sept. 192
Static switches run a sugar warehouse. Giacomelli & Bullock May 118
Tiny electronic controls run giant coal digger. Theuer & Lenhard Mar. 121
TV and magnetic tape speed Air Force warehousing (WN) Dec. 35

Mathematical analysis

Analog setup solves polynomials, plots root locus automatically. Leon Levine Oct. 125
Closed loop computer control at Luling. Eisenhardt & Williams. Nov. 103
Evaluating control system payout from process data. T. M. Stout Feb. 93
Quick new method gives system time constants. H. K. Chatterjee July 97
Separate signal from noise with probability filters. W. L. Still Mar. 147
Three analog computer circuits for the root locus. Gordon Carden Apr. 127
A unique analog analyzer for nonlinear systems. W. H. Alliston. Dec. 135

Measuring

Automatic resistance measurement system. R. M. Walker Mar. 165
Automatic welder gets position from arc current. K. J. Rhodes Oct. 147
Circuits for high-ambient, differential pressure measurement. G. J. Moynihan Apr. 163
Digital logic improves photoelectric length measurement. Robert Sterns. Dec. 114
The gyroscopic mass flowmeter. M. M. Decker May 139
Installing rotameters Mar. 115
Langley's tunnels play second fiddle to space age (WN) May 20
Measuring mega-ampere transient currents. C. D. Nail Jan. 153
Measuring tape wrapped on drum for digital encoding. Hall & Lapenson. Aug. 143
Pot null detectors control tracer lathe. W. A. Breaux July 121
Servo-balanced supply tank measures nozzle thrust. Harris & Dunstan. Feb. 115
Stream analyzer dynamics. R. L. Grantom & others.
Part I. Testing techniques and apparatus May 113
Part II. Refractometer response to temperature and composition change. July 104
Transistorized length gage scans hot steel. Carlson & Sampson Apr. 154
What eddy currents reveal about metals. Richard Hochschild Mar. 117

Meetings, news reports

ASME aviation conference—aping man on computers (WN) Aug. 38
Britain's IEA Show—four new electronic process controls debut (WN) July 25
IRE meeting: previewing the control highlights (WN) Mar. 22
ISA Show—sparse attendance shakes show (WN) Nov. 30
ISA Instrumental Methods of Analysis Symposium — chromatography steps up the pace (WN) July 37
JACC—mathematics ride high (WN) Nov. 46
100,000 jam Interkama (WN) Dec. 30
Russia not so shocking in 1960 visit (WN) Aug. 24
Russians ready red carpets—? (WN) June 27
WESCON: engineer's guide to 1960 sessions (WN) Aug. 29
WESCON: West Coast vies for electronics lead (WN) Oct. 38

Metals processing and finishing

Bringing hot strip mills under automatic control. Bristol & Kraft. Sept. 146
Digital computer runs hot plate mill. Cliff Burdick Jan. 126
Investigating thickness control on small scale rolling mills. R. B. Sims. June 95
Pop-up models program ingot soaking. L. N. Bramley May 157
Programmed manipulator cuts forging time. Baker & Tomlinson Sept. 194
Scale models save computing of cutting lengths at mill. L. N. Bramley Oct. 151
Transistorized length cage scans hot steel. Carlson & Sampson Apr. 154

Missiles

Better inertial indicators for attitude and heading. J. M. Slater Feb. 88
Novel caging scheme makes versatile stable platform. M. Selvin Apr. 138
Polaris—deliver first checkout gear. Jan. 25
Zeus production plans derailed again. Jan. 30

Motors, electrical (see Actuators)

N

Nonlinear systems

Optimum response relay servos. J. B. Lewis.
Part I: Evolution of the optimum switching criteria May 125
Part II: Putting the theory to work. July 77
Part III: Higher order and related systems Oct. 129
Stabilizing on-off pneumatic control systems. Karl Eklund Oct. 134
A unique analog analyzer for nonlinear systems. W. H. Alliston. Dec. 135

Nuclear instrumentation

British nuclear controls slowed by fear of government regulations. (WN) Jan. 42
How they tested the first nuclear rocket engine. Nov. 130
Safe, reliable process monitoring. R. Sherrard. Part I: What's needed. Dec. 87

O

On-off control systems

Optimum response relay servos. J. B. Lewis.
Part: I: Evolution of the optimum switching criteria. ..... May 125
Part II: Putting the theory to work. ..... July 77
Part III: Higher order and related systems. ..... Oct. 129
Simple RC anticipation for on-off controllers. ..... July 127
Single time-shared drive positions two axes. G. W. Younkin..... Aug. 122

P

Patents

Will Bullard's patent claims test numerical control? (WN)..... Sept. 54

Personality sketches

Axelby, George ..... Oct. 23
Cheney, Harold K..... May 15
Draper, C. Stark..... Jan. 15
Eisengrein, R. H..... Dec. 27
Hollander, G. L..... Mar. 15
Mayo, A. M..... July 15
Morgan, John M..... Feb. 15
Pierce, Dr. Lawrence..... June 15
Pompeo, D. J..... Aug. 19
Rosenbrock, Howard W..... Apr. 15
Ross, Douglas T..... Sept. 27
Williams, Theodore J..... Nov. 27

Pneumatics

Air expansion powers new actuator. H. W. Kogan..... Aug. 137
Binary pneumatic cylinders position printer head. R. M. Rose.... May 149
Blocking oscillator linearizes pneumatic/electric converter. W. J. Donnelly ..... Feb. 113
Electropneumatic speed regulator for turbine driven camera. Nail & Oja. June 133
Fluid computing elements open new doors in control. (WN)..... May 26
How to find emergency air needs for pneumatic instruments. F. Caplan. Oct. 127
Installing pneumatic signal transmission systems ..... Jan. 137
Pneumatic analog for process control studies at Yale ..... June 139
Stabilizing on-off pneumatic control systems. Karl Eklund..... Oct. 134

Process control

Automatic analyzers convert yeast plant to continuous operation. Sher & Rodgers ..... Sept. 190
Automatic vacuum system pipes bulk materials. C. H. Bast..... Sept. 197
Beta-gage controllers cut fabric coating waste. L. E. Taylor..... Nov. 153
Blocking oscillator linearizes pneumatic/electric converter. W. J. Donnelly ..... Feb. 113
Britain's IEA Show—four new electronic process controls debut. (WN) July 25
Closed loop computer control at Luling. Eisenhardt & Williams... Nov. 103
Colorimeter prevents mixing of transformer insulating liquids. Kinney & Burnett ..... May 151
A comparison of integral and incremental digital computers for process control applications. E. L. Braun Jan. 113
Controlling a thermal cracking furnace with a digital computer. J. R. Parsons & others..... Sept. 150
Cyanamid's approach to computer control. Herbert Grohskopf... Feb. 70
Electronic controls replace pneumatics on gas compressors. V. A. Riggio ..... Sept. 174
Four up-to-date blending systems. Derek Barlow ..... Sept. 180
German process control. (WN)... Feb. 36
Goodrich cases into computing control. (WN) ..... Apr. 20
Guide to controlling continuous-flow chemical reactors. Ole Andreas Solheim ..... Apr. 107
The gyroscopic mass flowmeter. M. M. Decker ..... May 139
How to find emergency air needs for pneumatic instruments. F. Caplan Oct. 127
Infrared analyzer controls hydrocarbon extraction process. D. M. Stagg & others ..... Dec. 109
Installing pneumatic signal transmission systems ..... Jan. 137
Installing rotameters ..... Mar. 115
Keeping sample lines hot. E. A. Houser ..... June 123
Pneumatic analog for process control studies at Yale..... June 139
Polaris propellant—first continuous production. (WN) ..... Oct. 32
Safe, reliable process monitoring. R. Sherrard. Part I: What's needed. Dec. 87
Simple digital servo programs process controller set-points. J. F. Sharp Jan. 149
Sizing analyzer sampling lines. E. A. Houser ..... Aug. 129
Stream analyzer dynamics. R. L. Grantom & others.
Part I: Testing techniques and apparatus ..... May 113
Part II: Refractometer response to temperature and composition change ..... July 104
Take a new look at the process control center. A. J. Waldron.... Mar. 132
Updating process instrument costs. J. W. Bernard ..... Apr. 143
What about pilot plant instrumentation. Fanning & Bryan..... July 85
What's available in Europe for electronic process control—report. Barlow & May. Part I June 103, Part II July 107, Part III ..... Oct. 105

Production control

Computer keeps tabs on work in process. E. W. Cannon..... Sept. 138
Controlling production paperwork. L. H. Young..... Sept. 140
Manufacturing control with a 705. J. M. Cherba..... May 132
New drives sharpen conveyor synchronization. R. B. Maag..... Sept. 192
Total production control in a package? (WN) ..... July 32
Will production monitoring spur textiles? (WN) ..... Dec. 42

Programmed systems

Automatic metalworking: a status report. J. D. Cooney..... Sept. 158
Electronic teacher conditions the reflexes (WN) ..... Dec. 39
3-axis tape control runs manufacturing machine. Michael Murphy.... Dec. 125
Innovations in numerical control.. Oct. 139
Magnetic discs add automatic control to lumber mill. (WN)..... Aug. 31
Numerical building blocks control turret lathe. H. W. Mergler..... July 69
Optical programmer for numerically controlled drill press. (WN).. Sept. 46
Pinwheels program British movies. Oct. 155
Pop-up models program ingot soaking. L. N. Bramley..... May 157
Programmed manipulator cuts forging time. Baker & Tomlinson.... Sept. 194
Punched tape controls carpet patterns. W. H. T. Neall..... Sept. 176
Punched tapes shape auto tailpipes. Mar. 161
Scented movies are Broadway's newest hit. (WN) ..... Mar. 25
Simple digital servo programs process controller set-points. J. F. Sharp. Jan. 149
Simple go/no-go electronic circuit checker pays off. G. G. Robinson June 137
Single time-shared drive positions two axes. G. W. Younkin..... Aug. 122
Switching networks program tube tester. P. E. Haddon..... May 142
Transistor NOR elements program welder. F. G. Dahlin..... Feb. 111
Transparent tape programmer breaks sock pattern jacks. Charles Conway. Oct. 153
A user reports: rapid return from tape control. (WN) ..... May 22

Proportioning

Four up-to-date blending systems. Derek Barlow ..... Sept. 180

R

Radiation gaging (see Gaging)

Recording

Compound modulation recording keeps strain gage signals clean. H. R. Darby ..... Mar. 163
Flux gate head reads stationary magnetic tape. dc signals. David Kerr. Mar. 145
Movie film developed in 60 seconds with new process. (WN)..... Apr. 25
Recording a variable and its integral with one pen. L. Pritkin..... Oct. 149
Thermoplastic recording excites industry. (WN) ..... Feb. 32

Relays

Hints for improving relay system reliability. B. K. Ledgerwood.... Dec. 104
How reliable are relays . . . B. K. Ledgerwood ..... Jan. 109
Optimum response relay servos. J. B. Lewis.
Part I: Evolution of the optimum switching criteria ..... May 125
Part II: Putting the theory to work. July 77
Part III: Higher order and related systems ..... Oct. 129
Transistor-relay hybrids for close-differential switching. A. N. DeSautels ..... Apr. 151

Reliability

Hints for improving relay system reliability. B. K. Ledgerwood.... Dec. 104
How reliable are relays . . . B. K. Ledgerwood ..... Jan. 109
Safe, reliable process monitoring. R. Sherrard. Part I: What's needed. Dec. 87
The story of an ultra-reliable computer. A. P. Hendrickson..... July 113

Russian control

Russian train computer controlled. G.

Kononenko ..... Apr. 159
Russians buy a tire plant. (WN) .. Mar. 40

S

Servomechanisms Sampled-data

Analysis and stabilization of sampled data systems. G. J. Thaler .... Jan. 123

(see also Digital servos)

The acceleration switching valve still has advantages. M. E. Moore .. June 89
Choosing the actuator for linear feed hydraulic servos. C. K. Taft ... Feb. 85
Don't overlook POSITIVE feedback. William Scharf ..... Nov. 115
Electropneumatic speed regulator for turbine driven cameras. Nail & Oja. June 133
Incremental servos. S. J. Bailey.
Part I: Stepping vs stepless control. Nov. 123
Part: Operation and analysis. Dec. 97
Optimum response relay servos. J. B. Lewis.
Part I: Evolution of the optimum switching criteria ..... May 125
Part II: Putting the theory to work. July 77
Part III: Higher order and related systems ..... Oct. 129
Reaction controllers maintain attitude of space vehicles. Sung & Teitelbaum ..... Jan. 151
Selecting amplifiers for high-performance servovalves. R. E. Claflin Jr. Nov. 139
Servo-balanced supply tank measures nozzle thrust. Harris & Dunstan Feb. 115
Short guide to military synchro specs. Oppenheim & Sachs ..... Mar. 137

Signal-noise improvement

Separate signal from noise with probability filters. W. L. Still ..... Mar. 147

Simulation

Analog setup solves polynomials, plots root locus automatically. Leon Levine ..... Oct. 125
How to compute load constants from response curve data. B. B. Bellit. May 105
Make statistical studies on analog simulations. W. E. Vander Velde. June 127
Simple analogs for useful nonlinearities. Kovach & Comley ..... Nov. 135
Simulation OKs C-stellerator power supply control system. J. R. Hurley ..... Dec. 133

Solid state devices

Counting pulses within the magnetic hysteresis loop. T. R. Nisbet .. Nov. 150
Molecular electronics: a concept with startling implications. (WN) ... Mar. 35
PNPN switches—diodes and triodes. J. M. Goldey ..... Oct. 101
That amazing semiconductor business. (IP) ..... May 91
Tunnel diode—will it fit into control? (WN) ..... Apr. 38

Space vehicle control

How to compute load constants from response curve data. B. B. Bellit. May 105
Langley's tunnels play second fiddle to space age. (WN) ..... May 20
Novel caging scheme makes versatile stable platform. M. Selvin .... Apr. 138
Reaction controllers maintain attitude of space vehicles. Sung & Teitelbaum ..... Jan. 151
Servo-balanced supply tank measures nozzle thrust. Harris & Dunstan Feb. 115
The system characteristics of modern guidance techniques — report. Dr. C. J. Mundo ..... Aug. 85
Wright-Patterson shifts gears: aircraft control spills over into space. (WN) Mar. 29

Speed-control

Compensating dc motors for fast response. S. W. Harris ..... Oct. 115
Dc drives set for new gains. (IP) .. Mar. 97
Digital gain changer gives optimum slowdown. D. A. Poepsel ..... July 125
Electropneumatic speed regulator for turbine driven cameras. Nail & Oja. June 133
Graph simplifies reel drive calculations. H. L. Steinmetz ..... Feb. 71
Speed control methods for dc motors. C. S. Siskind ..... June 115
The strange new ball motor. E. R. Laithwaite ..... Jan. 131
Two new ways to vary induction motor speed. E. R. Laithwaite .... July 92
Unique electric thruster uses two motors. D. L. Schrader ..... June 141

Stabilization

Analysis and stabilization of sampled data systems. G. J. Thaler .... Jan. 123
Don't overlook POSITIVE feedback. William Scharf ..... Nov. 115

Static control

Bistable jump circuit for static switching. P. J. Walsh ..... Aug. 132
Evaluating today's proximity switches. J. M. Morgan ..... Apr. 115
Static switches run a sugar warehouse. Gacomelli & Bullock ..... May 118
Transistor-relay hybrids for close-differential switching. A. N. De Sautels ..... Apr. 151
The versatile transistor NOR circuit. A. N. DeSautels ..... May 101

Statistical techniques

Make statistical studies on analog simulations. W. E. Vander Velde. June 127
Separate signal from noise with probability filters. W. L. Still ..... Mar. 147
Statistical computers can really reduce data. E. J. Schubert ..... Apr. 146

Switching techniques

Formulas for transistor dissipation during high frequency switching. Currence & Wheeler ..... Aug. 127
PNPN switches—diodes and triodes. J. M. Goldey ..... Oct. 101

Systems

Analysis
plots root locus automatically. Leon Levine ..... Oct. 125
Analysis and stabilization of sampled data systems. G. J. Thaler .... Jan. 123
Evaluating control system payout from process data. T. M. Stout. Feb. 93
Graph simplifies reel drive calculations. H. L. Steinmetz ..... Feb. 71
Guide to controlling continuous-flow chemical reactors. Ole Andreas Solheim ..... Aph. 107
Increment servos. S. J. Bailey.
Part I: Stepping vs stepless control ..... Nov. 123
Part II: Operation and analysis Dec. 97
Investigating thickness control on small scale rolling mills. R. B. Sims ..... June 95
Optimum response relay servos. J. B. Lewis.
Part I: Evolution of the optimum switching criteria ..... May 125
Part III: Putting the theory to work ..... July 77
Part III: Higher order and related systems ..... Oct. 129
Quick new method gives system time constants. H. K. Chatterjee. July 97
A simple template makes bode plots easy. C. A. Stapleton ..... Dec. 111
Stabilizing on-off pneumatic control systems. Karl Eklund ..... Oct. 134
Three analog computer circuits for the root locus. Gordon Carden. Apr. 127
A unique analog analyzer for nonlinear systems. W. H. Alliston. Dec. 135
Using corporate models for business control. H. R. Karp ..... Sept. 135
Design
Controlling a thermal cracking furnace with a digital computer. J. R. Parsons & others ..... Sept. 150
The story of an ultra-reliable computer. A. P. Hendrickson .... July 113
Specification
Instrument uncertainties—Part II What about scale factor and resolution? L. P. Entin ..... Feb. 75

T

Tape readers

Magnetic
Flux gate head reads stationary magnetic tape, dc signals. David Kerr ..... Mar. 145
Two stepping motors drive tape in versatile transport ..... Dec. 137
Other
Thermoplastic recording excites industry. (WN) ..... Feb. 32

Testing

Deliver first Polaris checkout gear (WN) ..... Jan. 25
Fast component tester checks itself, too. Saul Liss ..... Sept. 188
5 case studies show effects to simplify maintenance. B. K. Ledgerwood Mar. 126
Function generator control for vibration sweep testing. J. M. Chirnitch ..... Nov. 159
How they tested the first nuclear rocket engine ..... Nov. 130
Simple go/no-go electronic circuit checker pays off. G. G. Robinson ..... June 137
Switching networks program tube tester. P. E. Haddon ..... May 142
Test fixture aids design of fuel controller. H. S. D. Yang ..... July 89
What about pilot plant instrumentation. Fanning & Bryan ..... July 85
What eddy currents reveal about metals. Richard Hochschild ... Mar. 117

Training

National Education Act helps two ways (IP) ..... Aug. 77
Pneumatic analog for process control-studies at Yale ..... June 139
Shell Development Corp.—oil company's school (WN) ..... Feb. 20

Transducers

High output transducer makes tape tensioning simple. D. E. Pierce..Aug. 140
Instrument uncertainties — Part II, What about scale factor and resolution? L. P. Entin.....Feb. 75
6 transducers for precision position measurement. J. O. Morin.....May 107

Transistors

Don't overlook POSITIVE feedback. William Scharf .....Nov. 115
Formulas for transistor dissipation during high frequency switching. Currence & Wheeler .....Aug. 127
PNPN switches—diodes and triodes. J. M. Goldey .....Oct. 101
Regulated tuning fork runs wrist watch .....Nov. 163
Transistor NOR elements program welder. F. G. Dahlin.....Feb. 111
Transistor-relay hybrids for close-differential switching. A. N. DeSautels .....Apr. 151
Transistorized length gage scans hot steel. Carlson & Sampson.....Apr. 154
Transistorized position press for quick die change. W. D. Berry.....July 123
The versatile transistor NOR circuit. A. N. DeSautels .....May 101

Transportation

Is automatic transit coming? (WN) Apr. 36
Russian train computer controlled. G. Kononenko .....Apr. 159

V

Valves

The acceleration switching valve still has advantages. M. E. Moore..June 89
Selecting amplifiers for high-performance servovalves. R. E. Claflin Jr. Nov. 139

AUTHOR INDEX

Alliston, William H. A unique analog analyzed for nonlinear systems..Dec. 135
Andrews, A. J. & others. Controlling a thermal cracking furnace with a digital computer .....Sept. 150
Bailey, S. J. Incremental servos
Part I: Stepping vs stepless control .....Nov. 123
Part II: Operation and analysis Dec. 97
Baker, P. N. & A. Tomlinson. Programmed manipulator cuts forging time .....Sept. 194
Barker, Richard A. Techniques of dynamic display
Part I: Cathode ray tubes....Feb. 100
Part II: Optics at work.....Apr. 121
Part III: From TV pickup to matrix cells .....June 97
Barlow, Derek. Four up-to-date blending systems .....Sept. 180
Spinning transducers control spoke tension .....Apr. 130
What's available in Europe for electronic process control. Part I June 103, Part II July 107, Part III..Oct. 105
Bast. Carl H. Automatic vacuum system pipes bulk materials .....Sept. 197
Beinhocker, Gilbert D. Forward-backward counter for the Gray code.Feb. 117
Bell, Ray. Magnetic scale substitutes for light chopper .....Oct. 145
Bell, William D. Computer rescues the voting process .....Feb. 65
Bellan, T. M. Wind tunnel interrupts 709 for fast data reduction....Dec. 117
Bellit, B. B. How to compute load constants from response curve data..May 105
Bennett, Robert A. Data processing for numerical positioning systems...Jan. 142
Bernard, John W. Updating process instrument costs .....Apr. 143
Berry, W. D. Transistors position press for quick die change.....July 123
Bramley, L. N. Pop-up models program ingot soaking .....May 157
Scale models save computing of cutting lengths at mill .....Oct. 151
Braun, Edward L. A comparison of integral and incremental digital computers for process control applications..Jan. 113
Breaux, William A. Pot null detectors control tracer lathe .....July 121
Bristol, Donald & Steven Kraft. Bringing hot strip mills under automatic control .....Sept. 146
Bryan, J. D. & R. J. Fanning. What about pilot plant instrumentation July 85
Bullock, E. & G. Giacomelli. Static switches run a sugar warehouse..May 118
Burdick, Cliff. Digital computer runs hot plate mill .....Jan. 126
Burnett, J. W. & J. P. Kinney. Colorimeter prevents mixing of transformer insulating liquids.....May 151
Cannon, E. W. Computer keeps tabs on work in process .....Sept. 138
Caplan, F. How to find emergency air needs for pneumatic instruments Oct. 127
Carden, Gordon. Three analog computer circuits for the root locus.....Apr. 127
Carlson, G. J. & E. R. Sampson. Transistorized length cage scans hot steel .....Apr. 154
Caruthers, F. P. Prepunched keys permit rapid setup of drum programmer. Oct. 143
Chatterjee, H. K. Quick new method gives system time constants .....July 97
Chatterton, E. L. System considerations for guidance radars .....Aug. 93
Cherba, J. M. Manufacturing control with a 705 .....May 132
Chirnitch, J. M. Function generator control for vibration sweep testing..Nov. 159
Claflin, Raymond E. Jr. Selecting amplifiers for high-performance servovalves .....Nov. 139
Cole, Ben R. Doppler radar techniques for aerospace navigation .....Aug. 97
Comley, W. & L. D. Kovach. Simple analog for useful nonlinearities Nov. 135
Conway, Charles. Transparent tape programmer breaks sock pattern jacks Oct. 153
Cooney, John D. Automatic metalworking: a status report .....Sept. 158
Currence, E. J. & J. A. Wheeler. Formulas for transistor dissipation during high frequency switching .....Aug. 127
Danlin, Frans G. Transistor NOR elements program welder .....Feb. 111
Darby, H. R. Compound modulation recording keeps strain gage signals clean .....Mar. 163
Decker, Martin M. The gyroscopic mass flowmeter .....May 139
DeSautels, A. N. Transistor-relay hybrids for close-differential switching..Apr. 151
The versatile transistor NOR circuit May 101
Dexter, Albert M. Automatic inspection and computation reduce reject rate Sept. 185
Dietz, John J. Three magnets make simple linear to rotary converter..Dec. 131
Donnelly, W. J. Blocking oscillator linearizes pneumatic/electric converter .....Feb. 113
Dreifke. G. E. & others. Stream analyzer dynamics
Part I Testing techniques and apparatus .....May 113
Part II Refractometer response to temperature and composition change .....July 104
Dunstan, Phillip & Kenneth Harris. Servobalanced supply tank measures nozzle thrust .....Feb. 115
Durie, D. S. L. Oscillograph readerplotters can be breadboarded...Apr. 157
Eisenhardt, R. D. & T. J. Williams. Closed loop computer control at Luling .....Nov. 103
Eklund, Karl. Simple adaptive controller combines high stability, high accuracy .....Apr. 161
Stabilizing on-off pneumatic control systems .....Oct. 134
Elisworth, W. E. Bypass loop helps temperature controller maintain 1-deg control .....Mar. 159
Entin, Leonard P. Instrument uncertainties—Part II What about scale factor and resolution?.....Feb. 75
Fanning, R. J. & J. D. Bryan. What about pilot plant instrumentation July 85
Fowler, William J. Electronic logic controls bread weight .....Sept. 178
Freilich, Arthur. Eliminating diode redundancy in encoding and decoding matrices .....June 110
Galli, E. J. Nonideal diodes and practical function generators .....Feb. 107
Garnjost, Kenneth D. Coded air cylinders control table position.....Oct. 141
Giacomelli, G. & E. Bullock. Static switches run a sugar warehouse..May 118
Gibson, John E. Adaptive principle
Part I: Making sense out of the adaptive principle.....Aug. 113
Part II: Mechanizing the adaptive principle .....Oct. 109
Part III: Generalizing the adaptive principle .....Dec. 93
Gladnik, Irvin J. Protecting liquid rheostats .....Jan. 119
Goldey, j. M. PNPN switches—diodes and triodes .....Oct. 101
Grantom, R. L. & others. Stream analyzer dynamics
Part I: Testing techniques and apparatus .....May 113
Part II: Refractometer response to temperature and composition change .....July 104
Grohskopf, Herbert. Cyanamid's approach to computer control....Feb. 70
Haddon. Paul E. Switching networks program tube tester.....May 142
Hall, A. M. & S. Lapenson. Measuring tape wrapped on drum for digital encoding .....Aug. 143
Harris. Kenneth & Phillip Dunstan. Servobalanced supply tank measures nozzle thrust .....Feb. 115
Harris, S. W. Compensating dc motors for fast response .....Oct. 115

Hay, W. F. Precision differential capacitors for analog multiplication...June 139
Hendrickson, A. P. The story of an ultra-reliable computer .....July 113
Herscher, L. W. & others. Infrared analyzer controls hydrocarbon extraction process .....Dec. 109
Hochschild, Richard. What eddy currents reveal about metals .....Mar. 117
Hougen, J. O. & others. Stream analyzer dynamics
Part I: Testing techniques and apparatus .....May 113
Part II: Refractometer response to temperature and composition change .....July 104
Houser, E. A. Keeping sample lines hot June 123
Sizing analyzer sampling lines....Aug. 129
Hurley, J. R. Simulation OKs C-stellarator power supply control system....Dec. 133
Karp, Harry R. Using corporate models for business control .....Sept. 135
Keasal, M. A. Jr. Fail-safe circuit for high-speed transfer.....Nov. 161
Kerr, David. Flux gate head reads stationary magnetic tape, dc signals Mar. 145
Kinney, J. P. & G. W. Burnett. Colorimeter prevents mixing of transformer insulating liquids .....May 151
Kogan, Henry W. Air expansion powers new actuator .....Aug. 137
Kononenko, G. Russian train computer controlled .....Apr. 159
Kovach, L. D. & W. Comley. Simple analogs for useful nonlinearities. Nov. 135
Kraft, Steven & Donald Bristol. Bringing hot strip mills under automatic control .....Sept. 146
Krebs, Glen W. Gas diodes indicate and remember .....Dec. 129
Laithwaite, E. R. The strange new ball motor .....Jan. 131
Two new ways to vary induction motor speed .....July 92
Lapenson, S. & A. M. Hall. Measuring tape wrapped on drum for digital encoding .....Aug. 143
Ledgerwood, Byron K. 5 case studies show efforts to simplify maintenance .....Mar. 126
Hints for improving relay system reliability .....Dec. 104
How reliable are relays .....Jan. 109
Lenhard, G. & A. Theuer. Tiny electronic controls run giant coal digger..Mar. 121
Levine, Leon. Analog setup solves polynomials, plots root locus automatically .....Oct. 125
Lewis, John B. Optimum response relay servos
Part I: Evolution of the optimum switching criteria .....May 125
Part II: Putting the theory to work .....July 77
Part III: Higher order and related systems .....Oct. 129
Liss, Saul. Fast component tester checks itself, too .....Sept. 188
Maag, R. B. New drives sharpen conveyor synchronization .....Sept. 192
Macfarland, Willard C. Skewed-axis gears for low backlash .....Jan. 145
May, Ernest D. & Derek Barlow. What's available in Europe for electronic process control. Part I June 103, Part II July 107, Part III.....Oct. 105
McGarrell, P. H. Transistorized contouring system features detachable director .....Oct. 139
McGuire, L. A. Differential pressure controller for air doors.....July 129
Numerical building blocks control turret lathe .....July 69
Moore, Morton E. The acceleration switching valve still has advantages .....June 89
Morgan, John M. Evaluating today's proximity switches .....Apr. 115
Morin, John O. 6 transducers for precision position measurement ...May 107
Moynihan, Gerald J. Circuits for high-ambient, differential pressure measurement .....Apr. 163
Mundo, Dr. Charles J. Recognition in perceptive guidance systems....Aug. 105
The system characteristics of modern guidance techniques .....Aug 85
Murphy, Michael. 3-axis tape, control runs manufacturing machine...Dec. 125
Nail, Clelland D. Measuring megampere transient currents.....Jan. 153
Nail, C. D. & G. M. Oja. Electro pneumatic speed regulator for turbine driven cameras .....June 133
Neall, W. H. T. Punched tape controls carpet patterns .....Sept. 176
Nichinson, David B. Modern techniques in celestial navigation.....Aug. 101
Nisbet, T. R. Counting pulses within the magnetic hysteresis loop....Nov. 150
Oja, G. M. & C. D. Nail. Electropneumatic speed regulator for turbine driven cameras .....June 133
Oppenheim, J. & B. Sachs. Short guide to military synchro specs.....Mar. 137
Parsons, J. R. & others. Controlling a thermal cracking furnace with a digital computer .....Sept. 150
Peters, George A. A guide to the display of information.....May 123
Pierce, Donald E. High output transducer makes tape tensioning simple Aug. 140
Piskor, Joseph. Logger keeps track of time charges on five computers..Apr. 133
Poepsel, D. A. Digital gain changer gives optimum slowdown .....July 125
Pritkin, L. Recording a variable and its integral with one pen.....Oct. 149
Przewozniak, J. & others. Infrared analyzer controls hydrocarbon extraction process .....Dec. 109
Rhodes, Kenneth J. Automatic welder gets position from arc current..Oct. 147
Frame straightener programs bending automatically .....Aug. 139
Riggio, Vincent A. Electronic controls replace pneumatics on gas compressors .....Sept. 174
Robinson, George G. Simple go/no-go electronic circuit checker pays off June 137
Rodger, R. F. & H. Sher. Automatic analyzers convert yeast plant to continuous operation .....Sept. 190
Rose, Robert M. Binary pneumatic cylinders position printer head....May 149
Rothbart, Harold A. Mechanical control cams .....June 118
Sacs, B. & J. Oppenheim. Short guide to military synchro specs.....Mar. 137
Sampson, E. R. & G. J. Carlson. Transistorized length cage scans hot steel Apr. 154
Sarett, David P. System aspects of inertial navigator design.....Aug. 86
Scharf, William. Don't overlook POSITIVE feedback .....Nov. 115
Schrader, Dale L. Unique electric thruster uses two motors.....June 141
Schubert, E. J. Statistical computers can really reduce data.....Apr. 146
Selvin, H. Novel caging scheme makes versatile stable platform.....Apr. 138
Sharp, J. F. Simple digital servo programs process controller set-points Jan. 149
Using electronic adding machines as cheap ADP system components. Nov. 119
Shaw, Robert F. Techniques and equipment for digital data conversion. Mar. 107
Sher, H. & R. F. Rodger. Automatic analyzers convert yeast plant to continuous operation .....Sept. 190
Sherrard, R. Safe, reliable process monitoring Part I: What's needed...Dec. 87
Sims, Roy B. Investigating thickness control on small scale rolling mills..June 95
Siskind, C. S. Speed control methods for dc motors .....June 115
Slater, J. M. Better inertial indicators for attitude and heading.....Feb. 88
Sluis, Mark H. New look in machine tool controls .....Nov. 146
Smith, Edgar J. Telemeter system reads meters by telephone.....Nov. 155
Solheim, Ole Andreas. A guide to controlling continuous-flow chemical reactors .....Apr. 107
Stagg, D. M. & others. Infrared analyzer controls hydrocarbon extraction process .....Dec. 109
Stapleton, C. A. A simple template makes bode plots easy.....Dec. 111
Steinmetz, Hans L. Graph simplifies reel drive calculations .....Feb. 71
Stelmach, George. Two line hydraulic diagrams .....Dec. 120
Sterns, Robert. Digital logic improves photoelectric length measurement Dec. 114
Still, William L. Separate signal from noise with probability filters...Mar. 147
Stout, Thomas M. Evaluating control system payout from process data...Feb. 93
Summers, William A. Starting an electric generating station—automatically Sept. 154
Sung, C. B. & B. R. Teitelbaum. Reaction controllers maintain attitude of space vehicles .....Jan. 151
Taft, C. K. Choosing the actuator for linear feed hydraulic servos....Feb. 85
Taylor, L. E. Beta-gage controllers cut fabric coating waste.....Nov. 153
Teitelbaum, B. R. & C. B. Sung. Reaction controllers maintain attitude of space vehicles .....Jan. 151
Thaler, George J. Analysis and stabilization of sampled data systems....Jan. 123
Theuer, A. & G. Lenhard. Tiny electronic controls run giant coal digger Mar. 121
Tolin, E. D. & others. Controlling a thermal cracking furnace with a digital computer .....Sept. 150
Tomlinson, A. & P. N. Baker. Programmed manipulator cuts forging time .....Sept. 194
Vander Velde, Wallace E. Make statistical studies on analog simulations June 127
Vannah, William E. Automatic systems in the plant.....Sept. 132
Control enters a new decade.....Jan. 101
Vidal, Jacques. Simple logic logs lab measurements .....May 153
Waldron, A. James. Take a new look at the process control center.....Mar. 132
Walker, Robert M. Automatic resistance measurement system .....Mar. 165
Walsh, Philip J. Bistable jump circuit for static switching.....Aug. 132
Wayman, C. J. Shaft angle digitizer needs no brushes .....Aug. 145
Wheeler, J. A. & E. J. Currence. Formulas for transistor dissipation during high frequency switching.....Aug. 127
Williams, T. J. & R. D. Eisenhardt. Closed loop computer control at Luling .....Nov. 103
Wise, P. N. Choosing induction regulator for rectifier control.....July 109
Yang, Herman S. D. Test fixture aids design of fuel controller.....July 89
Young, Lewis H. Computers unfold the secrets of human behavior.....Oct. 120
Controlling production paperwork. Sept. 140
Younkin, George W. Single time-shared drive positions two axes.....Aug. 122
Zahorsky, L. A. Mechanical power amplifier boosts torque, transmits position .....Feb. 80
Zurbrick, John R. Electronic controls speed engine bore classification..July 99